VERTICAL SOLAR PV POLES



LIGMAN

Vertical Solar PV poles



Seamless vertical solar PV module integration

Seamless vertical integration is a clean efficient method to integrate solar photovoltaic technology into column lighting systems. Using this method, large flat solar panels are not fixed on top of the lighting column or system, but instead are placed around the lighting pole itself. This seamlessly integrates the technology aesthetically without compromising the efficiency, adding value to both designers and end users.

Vertical integration is more wind-resistant, reducing wind-loads and minimising the need for more expensive pole foundations. It also provides a reduced maintenance burden with the reduction of dirt build up on the photovoltaic surfaces requiring both less frequent and easier cleaning. The vertical wrap-around panels receive light more evenly and efficiently from the sun and sky during the course of daylight hours, even in darker climates and seasons.

Universal application

Can be used on any type of aluminium or steel pole, easy to assemble and locked into place. Poles can be sourced separately if needed and the modular design with adjustable spacing brackets ensures easy assembly into any type of pole configuration.

360° Full day charging

6 slim solar sections are fixed tightly onto a hexagon frame which ensures 50% of solar panel will face sunshine at any time of the day No onsite orientation is needed.

Modular installation

The cylindrical solar PV module is based on a modular design concept for easy installation and disassembly. It can be quickly and easily mounted onto any suitable pole.

Patented design

The cylindrical solar PV module is designed based on advanced concepts and manufactured to high standards. PCT pre-registration was processed in 180 countries to protect keymarkets.

Strong wind resistance

The cylindrical design reduces the wind load area and each module is directly fastened to the pole by 12 screws for better wind resistance. Ideal for very windy regions.

Anti snow covering

Cylindrical solar PV modules are mounted vertically, preventing build up of snow and dirt. This ensures that enough power can be generated even in very snowy climates.

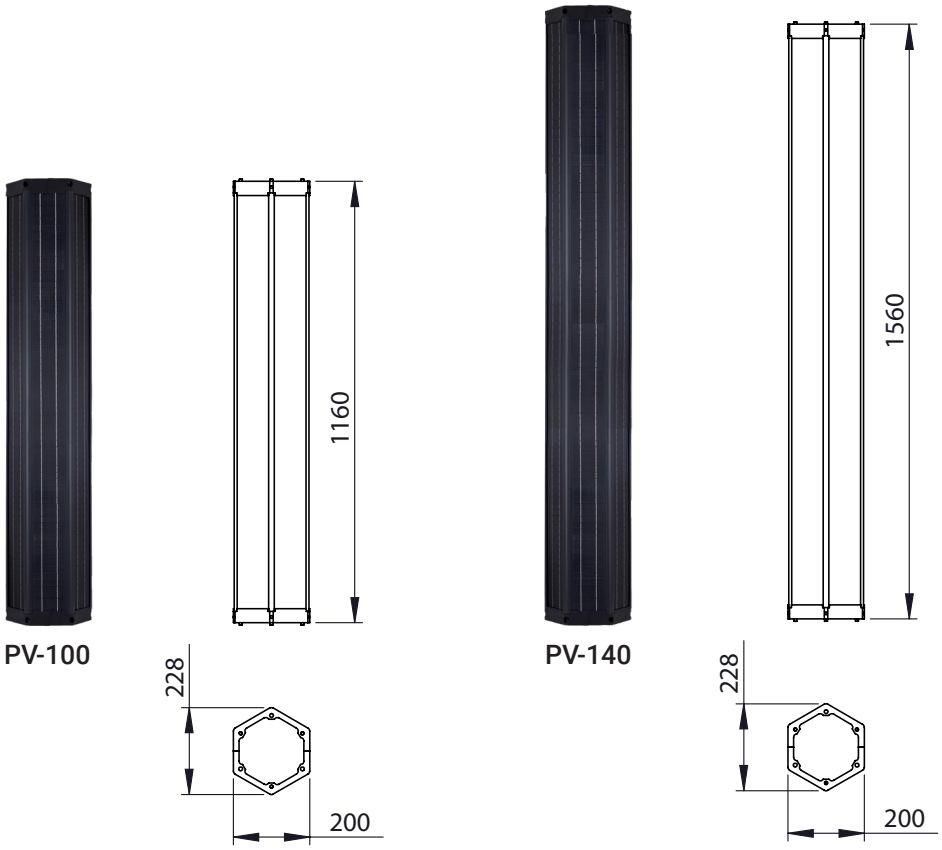
Easy to clean

Less dust will fall on the surface than on a regular solar panel. Maintenance workers can clean it easily standing on the ground with an extending low-pressure hose brush or spray cleaner. This results in higher work efficiency and reduced maintenance cost.

Design aesthetics

The module system is the real answer to design aesthetics, providing a compact and fully integrated green energy solution to the pole.

Vertical Solar PV poles



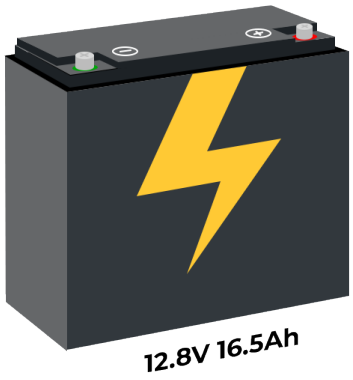
PV Specification

Model number	PV-100		PV-140	
Maximum power	100 W		140 W	
Maximum power voltage	18V	36V	18V	36V
Maximum power current	5.56A	2.78A	7.78A	3.89A
Cell type	Mono - Crystalline			
Material	Aluminium + Tempered glass			
International protection standard rate	IP65			
Solar cell efficiency	>20.5%			
Cable type	2.5 mm^2 with MC4			
Operating temperature	-40°C ~ +80°C			
Warranty	5 years			
Rated life-time	>20 years			
Net weight	15.80 Kgs		25.60 Kgs	
Gross weight	17.50 Kgs		27.80 Kgs	

Lithium Iron phosphate (LiFePO4) battery

Feature

- Using the technology of lithium iron phosphate cell, superior safety, thousands of cycles, 100% DOD, under normal conditions.
- Built-in automatic protection for over-charge, over discharge, over current and over temperature.
- Free of maintenance
- Internal cell balancing
- Lighter weight: About 40% ~ 50% of the weight of a comparable lead acid battery
- Can be charged using most standard lead-acid charges (set)
- Wider temperature range: -20°C ~ 60°C
- Support for Series application expansion (up to 51.2V) and two inparallel

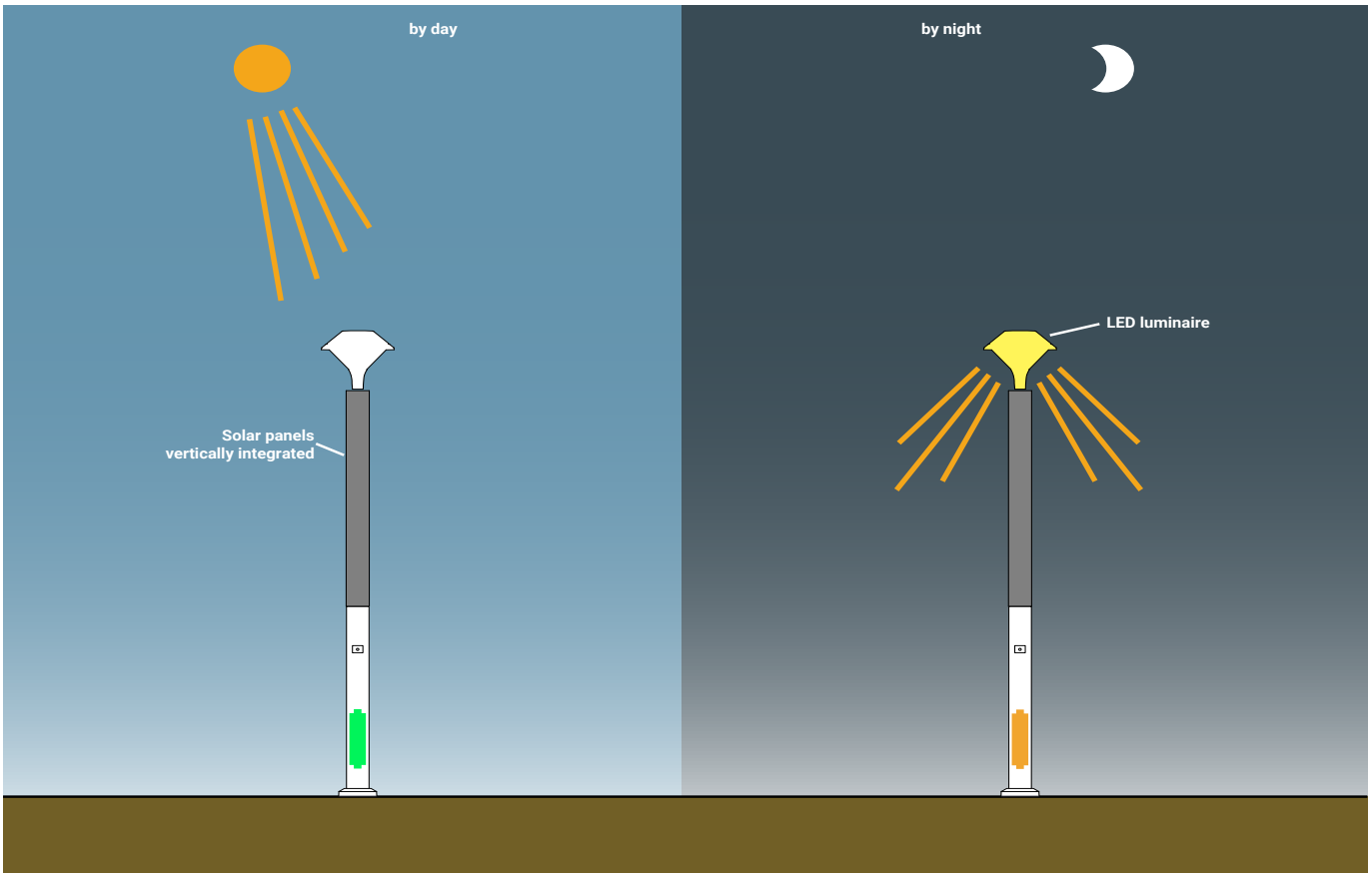


General specications

Electrical characteristics	Nominal voltage	12.8V
	Nominal capacity	16.5Ah@0.2C
	Energy	211.2Wh
	Internal resistance	60≤mΩ
	Cycle life	2000 Cycles @ 0.2C Charging/Discharging ,Until 70% Capacity
	Self discharge	≤3.5% per month at 25°C
Standard charging	Max. Charging voltage	14.0 ~ 14.6V
	Charging mode	At 0°C ~ 45°C temperature, charged to 14.6V at a constant current of 0.2C5A and then charged continuously with constant voltage of 14.6V until the current was not more than 0.02C5A
	Charging current	3.3A
	Max. Charging current	8.25A
Standard discharging	Discharging current	3.3A
	Max. Continuous current	15A
	Max. Pulse current	50A(<3S)
	Discharging cut-off voltage	10.0
Operating conditions	Charge temperature	0°C to 45°C(32°C to 113°C) @60±25% Relative Humidity
	Discharge temperature	-20°C to 60°C(-4°C to 140°C) @60±25% Relative Humidity
	Storage temperature	0°C to 45°C(32°C to 113°C) @60±25% Relative Humidity
	Water dust resistance	IP55
Structure	Cell & format	IFR32700 N55,4S3P
	Casing	Plastic
	Dimension (L*W*H*TH)	181*77*167*167mm
	Weight	Approx. 2Kg
	Terminal	M5

Vertical Solar PV poles

Rechargeable batteries are mounted inside the pole

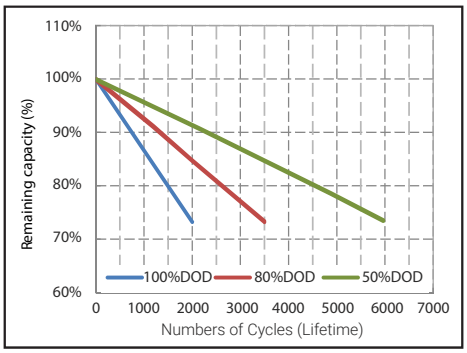


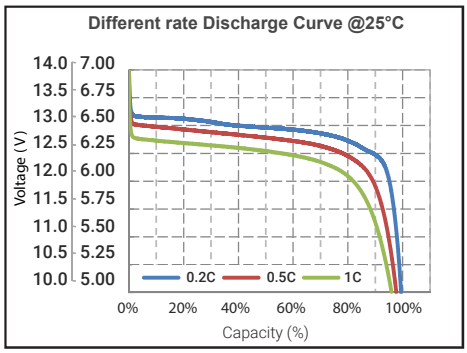
Energy stored within the batteries

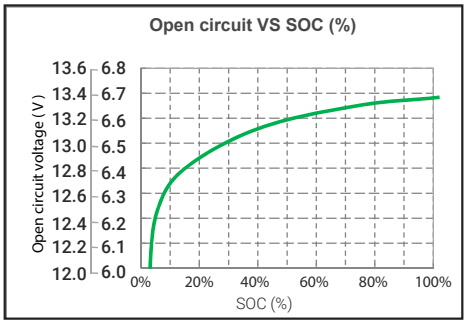
Batteries release energy to power the luminaire(s)

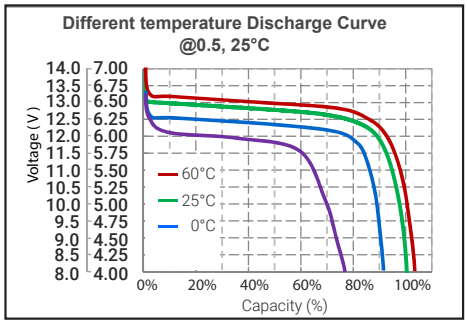
Test performance of liFe PO4 batteries

Different depth of discharge (DOD) discharge cycle life curve @25°C

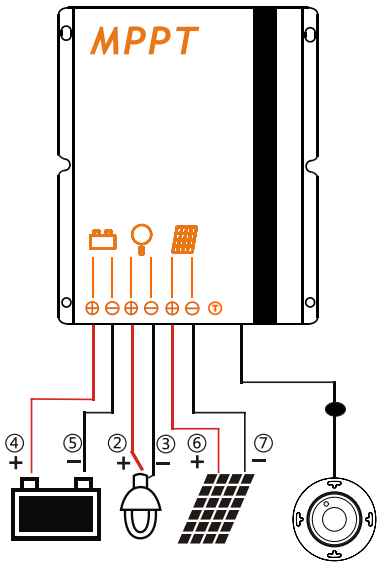








Solar charge controller

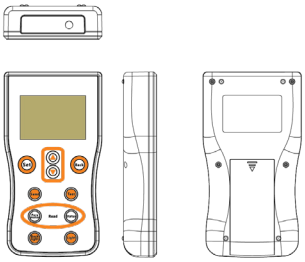


- Innovative max power point tracking (MPPT) technology, tracking efficiency >99%
- Full digital technology, high charge conversion efficiency up to 97%.
- Full digital technology, high discharge conversion efficiency up to 96%.
- Precision constant current control supports from 50mA up to 100mA
- 5 timed dimming stages can be programmed from 0% to 100% dimming levels
- Remote control operation
- Dimming levels adapt to low voltage battery conditions
- Automatic recognition of system voltage, 12V and 24V
- Motion detection for adapting dimming levels based on pedestrian needs
- External temperature sensor
- IP67, Strong and durable aluminum case
- Full automatic electronic protection

Remote solar charge controller



A92291



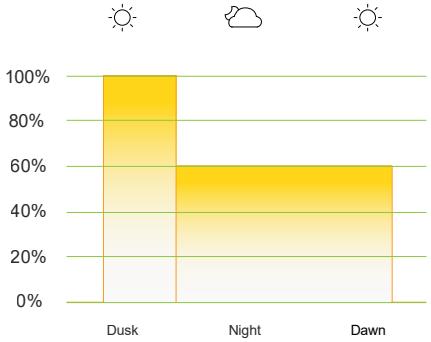
Battery model	(AA) x 2Pcs
Power supply voltage	3.0V
Power consumed of sleep mode	<6uA
Normal power consumption	<6mA
Sending power consumption	<20mA
Light consumption	<15mA
Backlight consumption	<7mA
Effective distance	<8m
Size	120x65x20 (L x W x H)
Weight	92g (Not including the battery)
Automatic sleep	1min
Lighting time	30s
Backlight time	30s
2000mAH battery setting quantity	50000 (Backlight and light are closed)
Working temperature	-25°C ~ 50°C
Protection degree	IP22

Charge controllers

LIGMAN provides programmable charge controllers that can be set for any desired setting for dusk to dawn pole operation. With timers and/or sensor overrides as required. Some typical algorithm examples are shown below:

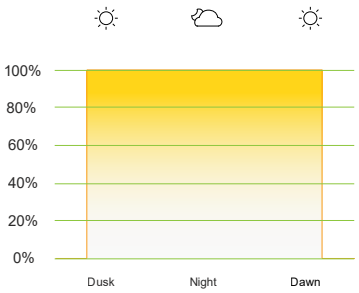
Standard setting type:

2 stage Step - Dimming

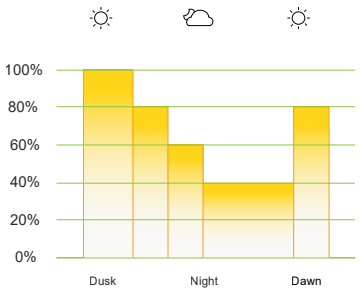


Custom setting type option:

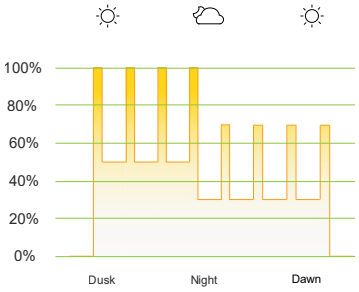
Dusk to Dawn (D2D)



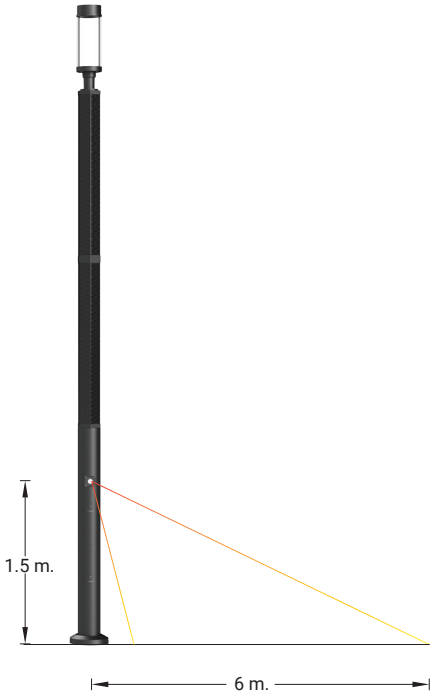
5 stage Step - Dimming

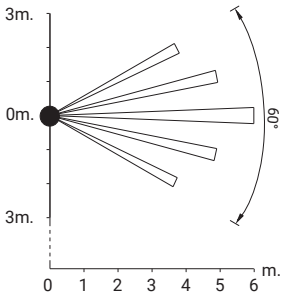


Motion sensor override



Motion sensor detection area





Sensor: Adjustable sensor

Time: 10 sec. - 150 sec.

Sensitivity 60°

Vertical Solar PV poles

Galvanised steel lighting columns covered with Vertical Solar PV poles.

Luminaire Structure

- Solar module consists of monocrystalline high-efficiency cells
- Lithium Iron Phosphate (LiFePO4) battery
- Dimming range 0-100%
- Different dimming scenarios are available: Step dimming, Dusk to dawn, Five-stage night mode, Custom hours
- Integrated temperature & motion sensors
- Remote solar charger controller system can be ordered as an accessory

Product code	System	Solar module power	Battery LiFePO4 12V 16.5Ah	20W		30W		40W		60W		80W	
				Luminaires operating 100%	Standard dimming	Luminaires operating 100%	Standard dimming	Luminaires operating 100%	Standard dimming	Luminaires operating 100%	Standard dimming	Luminaires operating 100%	Standard dimming
Post top luminaires													
SOL-20001	12Vdc	2X100 W	2X16.5Ah	8.7 Hr.	12.6Hr.	-	-	3.8 Hr.	5.4 Hr.	-	-	-	-
SOL-20011	12Vdc	2X140 W	3X16.5Ah	12.3Hr.	17.6Hr.	-	-	6.1 Hr.	8.8 Hr.	-	-	-	-
SOL-20051	12Vdc	2X140 W	6X16.5Ah	12.3Hr.	17.6Hr.	-	-	6.1 Hr.	8.8 Hr.	-	-	-	-
Street & are luminaires													
SOL-20021	24Vdc	4X100 W	4X16.5Ah	15 Hr.	21.7 Hr.	10 Hr.	14.4 Hr.	7.5 Hr.	10.8 Hr.	5 Hr.	7.2 Hr.	3.8 Hr.	5.4 Hr.
SOL-20031	24Vdc	4X140 W	4X16.5Ah	24.5 Hr.	35.4 Hr.	16.3 Hr.	23.6 Hr.	12.3 Hr.	17.7 Hr.	8.2 Hr.	11.8 Hr.	6.1 Hr.	8.8 Hr.
SOL-20041	24Vdc	4X140 W	6X16.5Ah	24.5 Hr.	35.4 Hr.	16.3 Hr.	23.6 Hr.	12.3 Hr.	17.7 Hr.	8.2 Hr.	11.8 Hr.	6.1 Hr.	8.8 Hr.
SOL-20061	24Vdc	3X140 W	8X16.5Ah	18.4 Hr.	26.5 Hr.	12.3 Hr.	17.7 Hr.	9.2 Hr.	13.3 Hr.	6.1 Hr.	8.8 Hr.	4.6 Hr.	6.6 Hr.

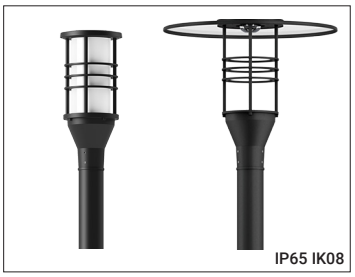
Luminaires modified for Vertical Solar PV poles

Post top and Street & area lighting luminaires that are modified to use with Vertical Solar PV poles.

Post top luminaires on request



ABERDEEN



FORREY



MACARON



ARIZONA

Street & Area luminaires on request



BILLUND



POWERMISSION



STEAMER

Vertical Solar PV poles

Luminaires modified for Vertical Solar PV poles

Product code guide

ABA-20001-SO-20 - T3 - W30 - STD - SOL-20001- A92291

Optic | CCT | Option setting type | Vertical solar pv pole | Accessory

Colour temperature
W30 – 3000K
W40 – 4000K

Option setting type
STD – Standard
CT – Custom

Accessory
A92291 – Remote Solar Charge Controller

Vertical Solar PV poles option for Post top
SOL-20001 – (2x100 W - Battery 12V 2x16.5Ah)
SOL-20011 – (2x140 W - Battery 12V 3x16.5Ah)
SOL-20051 – (2x140 W - Battery 12V 6x16.5Ah)

Vertical Solar PV poles option for Street & area
SOL-20021 – (4x100 W - Battery 12V 4x16.5Ah)
SOL-20031 – (4x140 W - Battery 12V 4x16.5Ah)
SOL-20041 – (4x140 W - Battery 12V 6x16.5Ah)
SOL-20061 – (3x140 W - Battery 12V 8x16.5Ah)

	Product code	Lamp	Power	Lumen	EEC	Weight	Optic			CCT
							T2	T3	T4	
Post top luminaires										
ABERDEEN 1	**ABA-20001-SO-20**	24 LED	20 W	2738 lm	A++	11.5 kg	142°x59°	142°x72°	102°x63°	W 30 | 40
	ABA-20001-SO-40	24 LED	40 W	5477 lm	A++	11.5 kg	142°x59°	142°x72°	102°x63°	W 30 | 40
ABERDEEN 2	**ABA-20011-SO-20**	24 LED	20 W	2738 lm	A++	10.5 kg	142°x59°	142°x72°	102°x63°	W 30 | 40
	ABA-20011-SO-40	24 LED	40 W	5477 lm	A++	10.5 kg	142°x59°	142°x72°	102°x63°	W 30 | 40
FORREY 14	**FOR-20022-SO-20**	1 COB	20 W	1907 lm	A+	13.5 kg	140°x100°	132°x103°	137°x117°	W 30 | 40
	FOR-20022-SO-40	1 COB	40 W	3814 lm	A+	13.5 kg	140°x100°	132°x103°	137°x117°	W 30 | 40
FORREY 12	**FOR-20042-SO-20**	1 COB	20 W	1907 lm	A+	17.0 kg	140°x100°	132°x103°	137°x117°	W 30 | 40
	FOR-20042-SO-40	1 COB	40 W	3814 lm	A+	17.0 kg	140°x100°	132°x103°	137°x117°	W 30 | 40
MACARON 1	**MC-20002-SO-20**	24 LED	20 W	2550 lm	A++	13.5 kg	136°x51°	119°x86°	102°x73°	W 30 | 40
	MC-20002-SO-40	24 LED	40 W	5100 lm	A++	13.5 kg	136°x51°	119°x86°	102°x73°	W 30 | 40
MACARON 2	**MC-20012-SO-20**	24 LED	20 W	2550 lm	A++	13.5 kg	136°x51°	119°x86°	102°x73°	W 30 | 40
	MC-20012-SO-40	24 LED	40 W	5100 lm	A++	13.5 kg	136°x51°	119°x86°	102°x73°	W 30 | 40
ARIZONA 5	**AR-21052-SO-20**	16 LED	20 W	2101 lm	A++	8.1 kg	142°x52°	137°x65°	93°x64°	W 30 | 40
	AR-21052-SO-40	16 LED	40 W	4201 lm	A++	8.1 kg	142°x52°	137°x65°	93°x64°	W 30 | 40
Street & area luminaires										
BILLUND 1	**BIU-90002-SO-40**	24 LED	40 W	5247 lm	A++	4.5 kg	150°x75°	137°x71°	102°x63°	W 30 | 40
	BIU-90002-SO-60	24 LED	60 W	7871 lm	A++	4.5 kg	150°x75°	137°x71°	102°x63°	W 30 | 40
	BIU-90002-SO-80	24 LED	80 W	10494 lm	A++	4.5 kg	150°x75°	137°x71°	102°x63°	W 30 | 40
POWERMISSION 2	**PO29-GP041-SO-20**	24 LED	20 W	2444 lm	A+	4.8 kg	142°x53°	141°x69°	99°x79°	W 30 | 40
	PO29-GP041-SO-30	24 LED	30 W	3555 lm	A+	4.8 kg	142°x53°	141°x69°	99°x79°	W 30 | 40
	PO29-GP041-SO-40	24 LED	40 W	4889 lm	A+	4.8 kg	142°x53°	141°x69°	99°x79°	W 30 | 40
	PO29-GP041-SO-60	24 LED	60 W	7110 lm	A+	4.8 kg	142°x53°	141°x69°	99°x79°	W 30 | 40
	PO29-GP041-SO-80	24 LED	80 W	8890 lm	A+	4.8 kg	142°x53°	141°x69°	99°x79°	W 30 | 40
STEAMER 1	**SE-90002-SO-40**	24 LED	40 W	5399 lm	A++	10.1 kg	136°x51°	119°x86°	102°x74°	W 30 | 40
	SE-90002-SO-60	24 LED	60 W	8098 lm	A++	10.1 kg	136°x51°	119°x86°	102°x74°	W 30 | 40
	SE-90002-SO-80	24 LED	80 W	10797 lm	A++	10.1 kg	136°x51°	119°x86°	102°x74°	W 30 | 40
STEAMER 11	**SE-90022-SO-40**	24 LED	40 W	5399 lm	A++	11.2 kg	136°x51°	119°x86°	102°x74°	W 30 | 40
	SE-90022-SO-60	24 LED	60 W	8098 lm	A++	11.2 kg	136°x51°	119°x86°	102°x74°	W 30 | 40
	SE-90022-SO-80	24 LED	80 W	10797 lm	A++	11.2 kg	136°x51°	119°x86°	102°x74°	W 30 | 40

Feature Symbol



Luminaire colour code



- 01 Black RAL 9011
- 02 Dark Grey RAL 7043
- 03 White RAL 9003
- 05 Matt Silver RAL 9006
- 06 Bronze RAL 6014

Light Symbol



Area lighting with light distribution — Type-2
Shallow reach horizontal lighting distribution



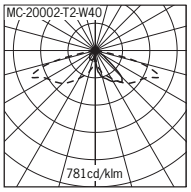
Area lighting with light distribution — Type-3
Mid-range horizontal lighting distribution

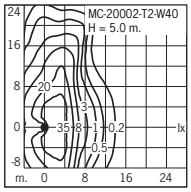


Area lighting with light distribution — Type-4
Forward-throw lighting distribution

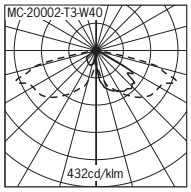
Photometric

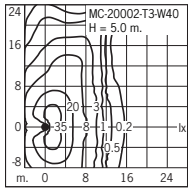
T2



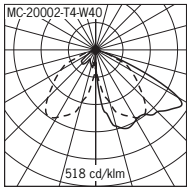


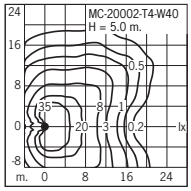
T3





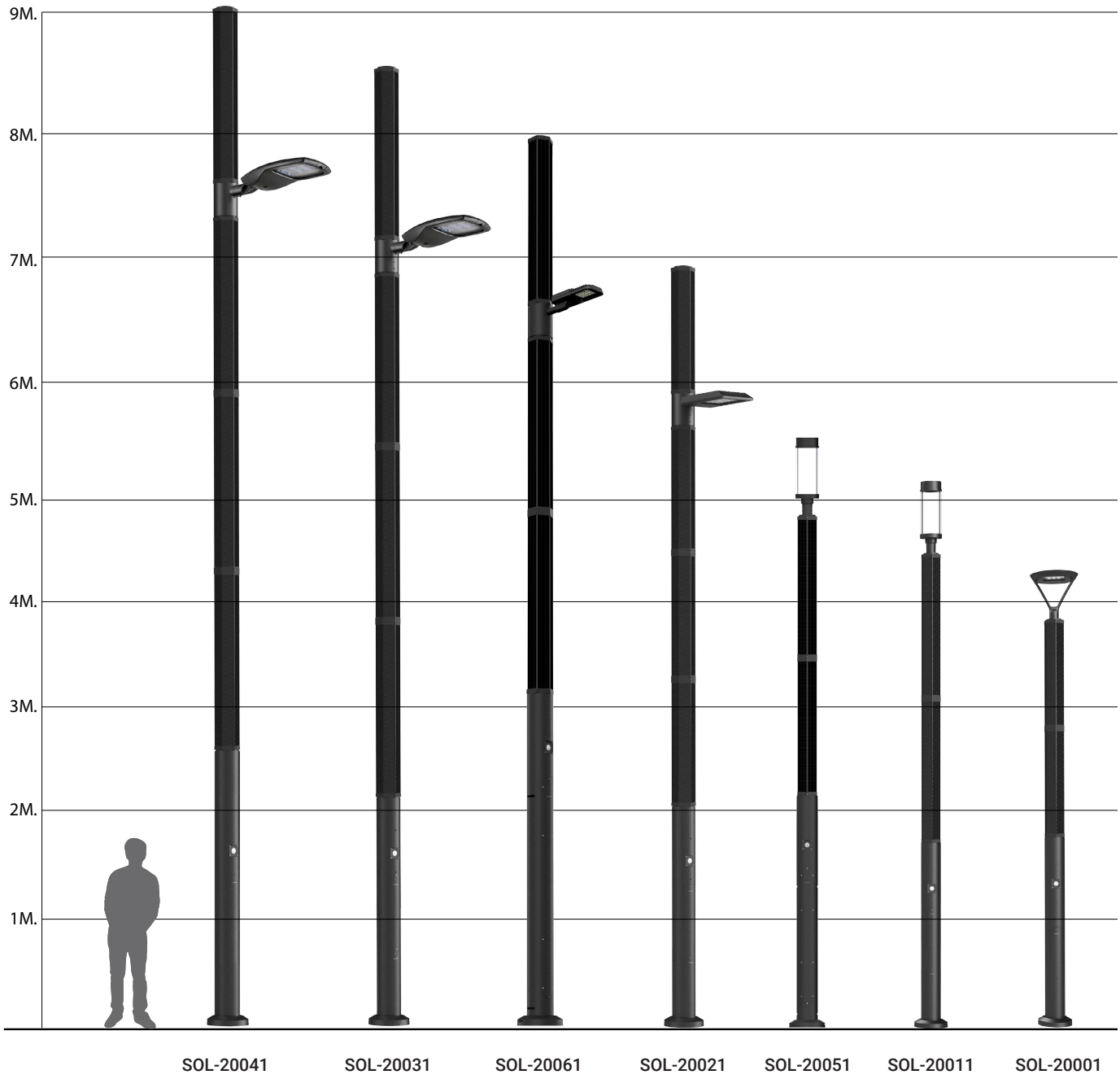
T4





Vertical Solar PV poles

Vertical Solar PV poles with luminaires



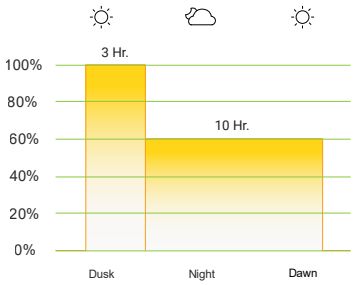
Vertical Solar PV poles - Post top luminaires

SOLAR PV POLE 1

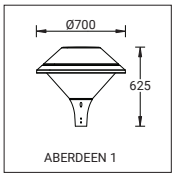
Solar module power	2x100 W
Battery	12V 2x16.5Ah
Diameter	Ø216
Luminaires operating 100 %	20 W (8-9 Hours)
	40 W (3-4 Hours)
Spigot	76 mm
Thickness	4 mm
Height	4337 mm
Weight	136.6 kg

LIGMAN's team of engineers can design a specific solar solution to meet the lighting requirements for your project. Please contact your local sales representative.

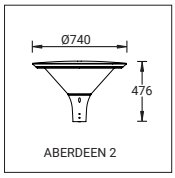
Standard:2 stage step-dimming, occupancy dimming and sensor.



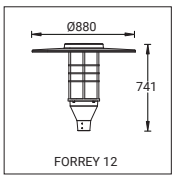
You can set the time and dim with the remote solar charge controller.



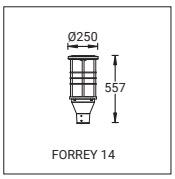
ABERDEEN 1



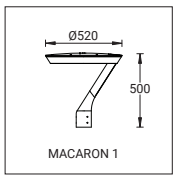
ABERDEEN 2



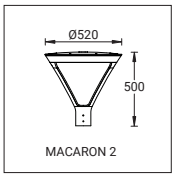
FORREY 12



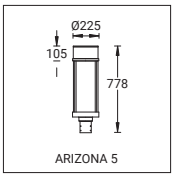
FORREY 14



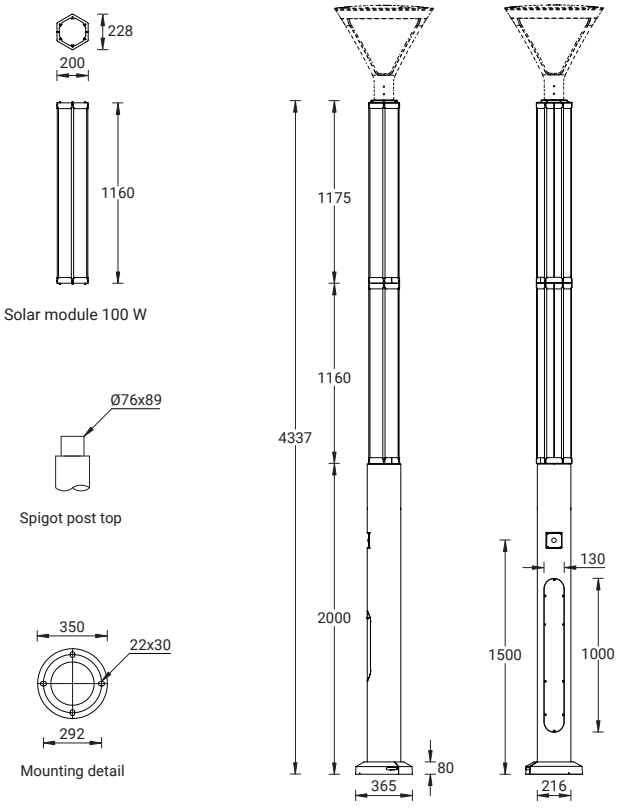
MACARON 1



MACARON 2



ARIZONA 5





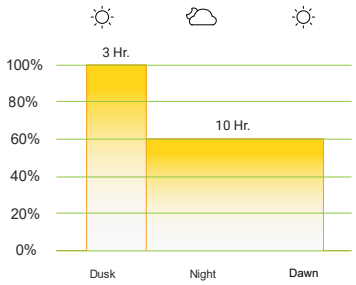
Vertical Solar PV poles - Post top luminaires

SOLAR PV POLE 2

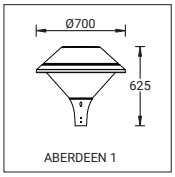
Solar module power	2x140 W
Battery	12V 3x16.5Ah
Diameter	Ø216
Luminaires operating 100 %	20 W (12-13 Hours)
	40 W (6-7 Hours)
Spigot	76 mm
Thickness	4 mm
Height	5137 mm
Weight	170.6 kg

LIGMAN's team of engineers can design a specific solar solution to meet the lighting requirements for your project. Please contact your local sales representative.

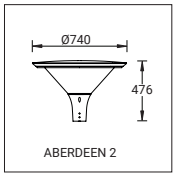
Standard:2 stage step-dimming, occupancy dimming and sensor.



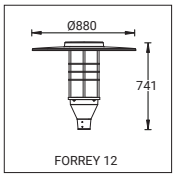
You can set the time and dim with the remote solar charge controller.



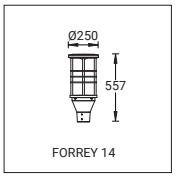
ABERDEEN 1



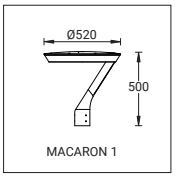
ABERDEEN 2



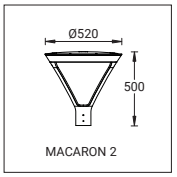
FORREY 12



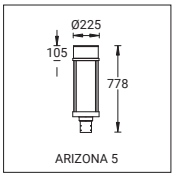
FORREY 14



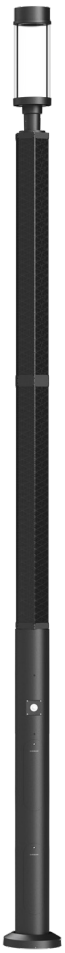
MACARON 1

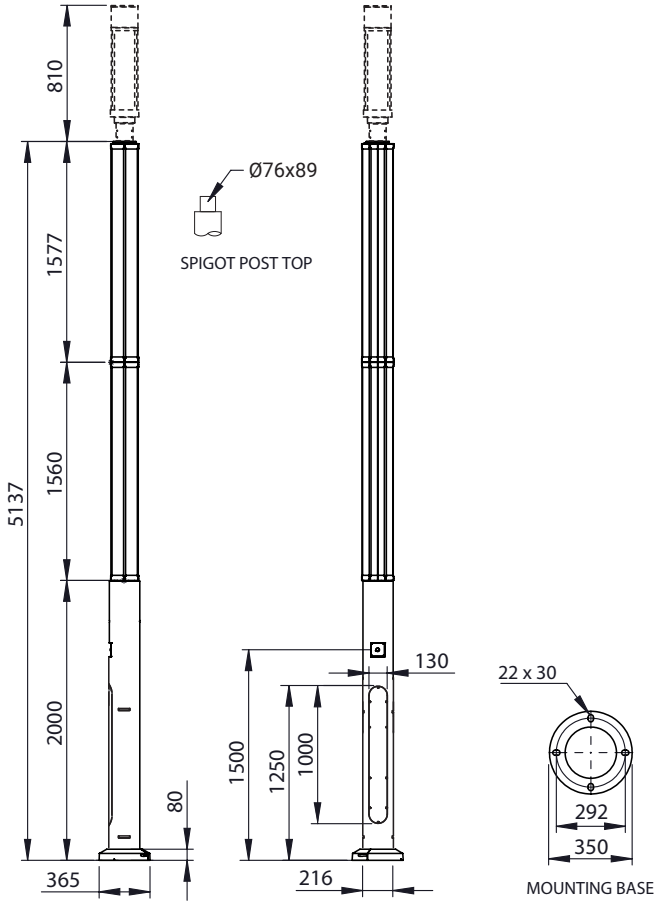


MACARON 2



ARIZONA 5





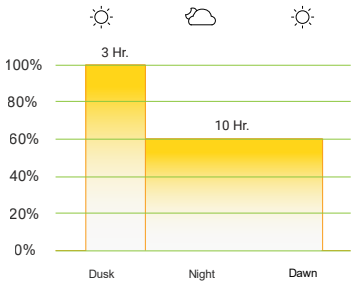
Vertical Solar PV poles - Post top luminaires

SOLAR PV POLE 6

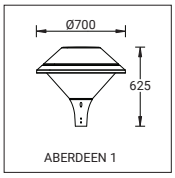
Solar module power	2x140 W
Battery	12V 6x16.5Ah
Diameter	Ø216
Luminaires operating 100 %	20 W (12-13 Hours)
	40 W (6-7 Hours)
Spigot	76 mm
Thickness	4 mm
Height	5637 mm
Weight	200.2 kg

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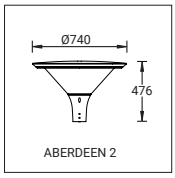
Standard:2 stage step-dimming, occupancy dimming and sensor.



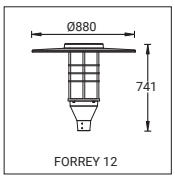
You can set the time and dim with the remote solar charge controller.



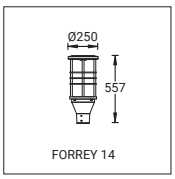
ABERDEEN 1



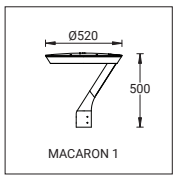
ABERDEEN 2



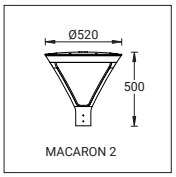
FORREY 12



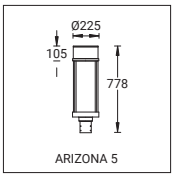
FORREY 14



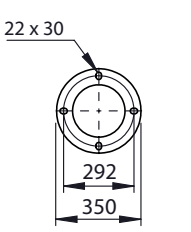
MACARON 1



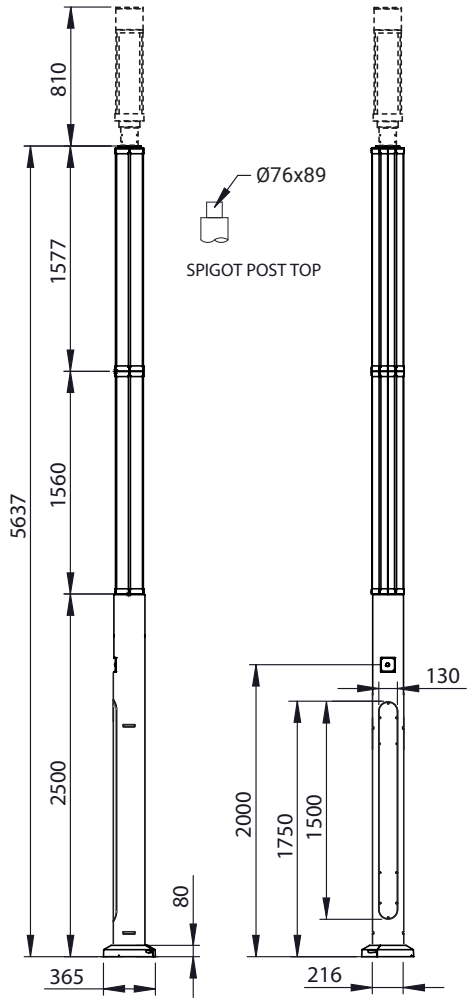
MACARON 2

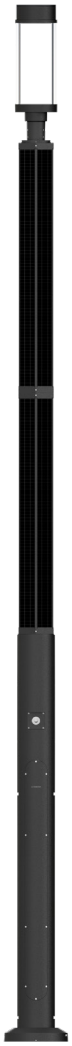


ARIZONA 5



MOUNTING BASE



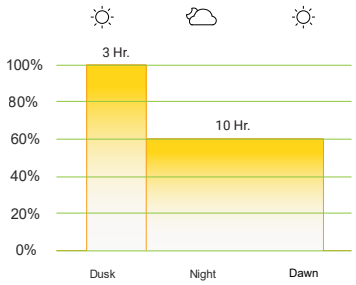


SOLAR PV POLE 3

Solar module power	4x100 W
Battery	12V 4x16.5Ah
Diameter	Ø216
Luminaires operating 100 %	20 W (14-15 Hours)
	30 W (9-10 Hours)
	40 W (7-8 Hours)
	60 W (4-5 Hours)
	80 W (3-4 Hours)
Spigot	76 mm
Thickness	4 mm
Height	6955 mm
Weight	199.6 kg

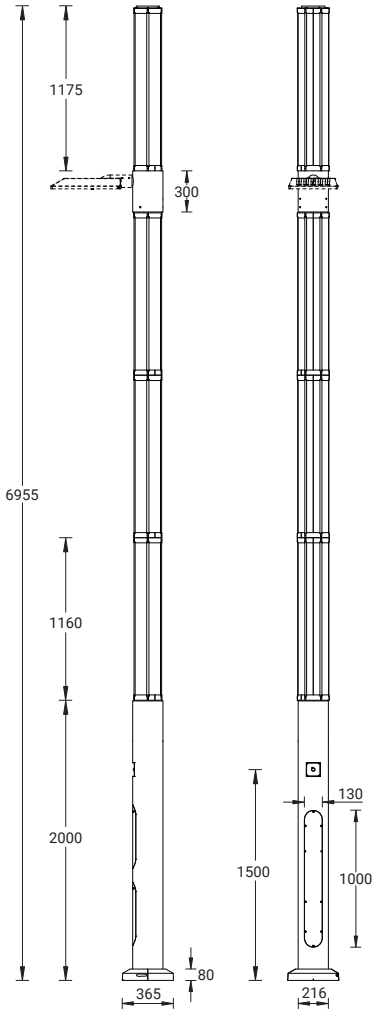
LIGMAN's team of engineers can design a specific solar solution to meet the lighting requirements for your project. Please contact your local sales representative.

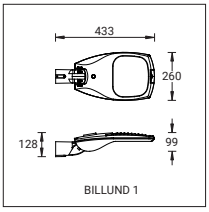
Standard:2 stage step-dimming, occupancy dimming and sensor.

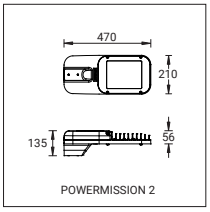


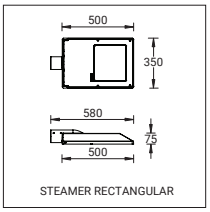
You can set the time and dim with the remote solar charge controller.

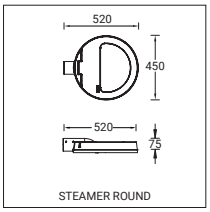


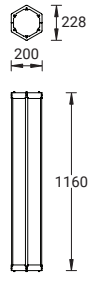




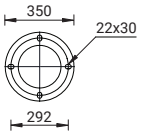








Solar module 100 W



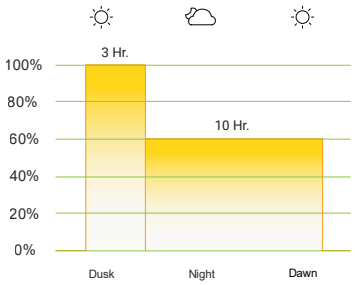
Mounting detail

SOLAR PV POLE 4

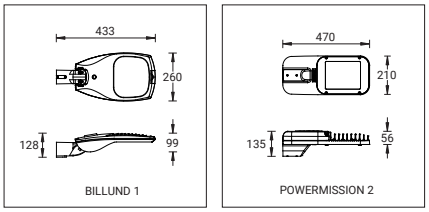
Solar module power	4x140 W
Battery	12V 4x16.5Ah
Diameter	Ø216
Luminaires operating 100 %	20 W (24-25 Hours)
	30 W (16-17 Hours)
	40 W (12-13 Hours)
	60 W (8-9 Hours)
	80 W (6-7Hours)
Spigot	76 mm
Thickness	4 mm
Height	8555 mm
Weight	263.5 kg

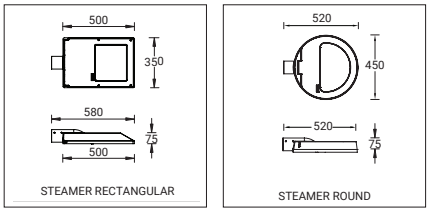
LIGMAN's team of engineers can design a specific solar solution to meet the lighting requirements for your project. Please contact your local sales representative.

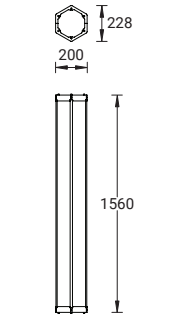
Standard:2 stage step-dimming, occupancy dimming and sensor.



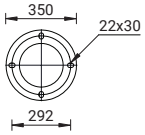
You can set the time and dim with the remote solar charge controller.



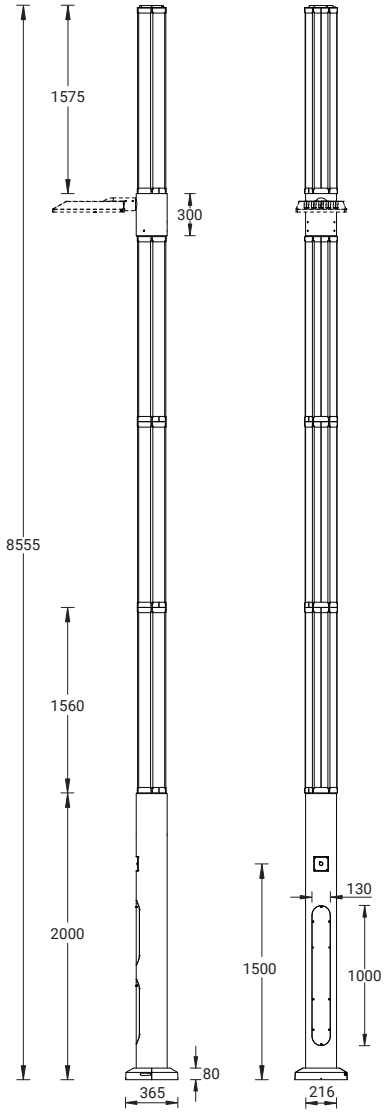


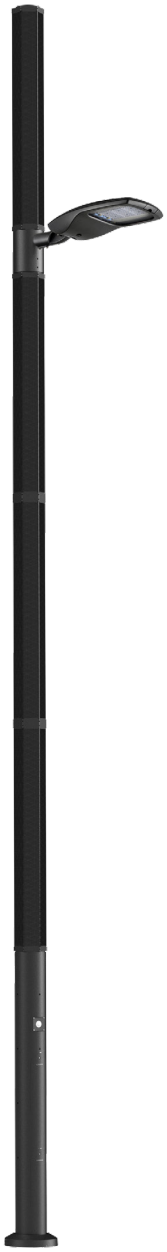


Solar module 140 W



Mounting detail



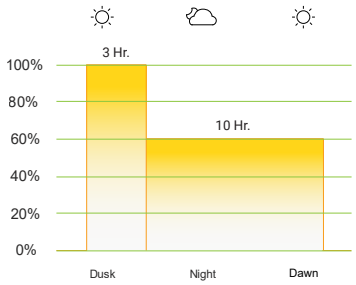


SOLAR PV POLE 5

Solar module power	4x140 W
Battery	12V 6x16.5Ah
Diameter	Ø216
Luminaires operating 100 %	20 W (24-25 Hours)
	30 W (16-17 Hours)
	40 W (12-13 Hours)
	60 W (8-9 Hours)
	80 W (6-7 Hours)
Spigot	76 mm
Thickness	4 mm
Height	9055 mm
Weight	284.8 kg

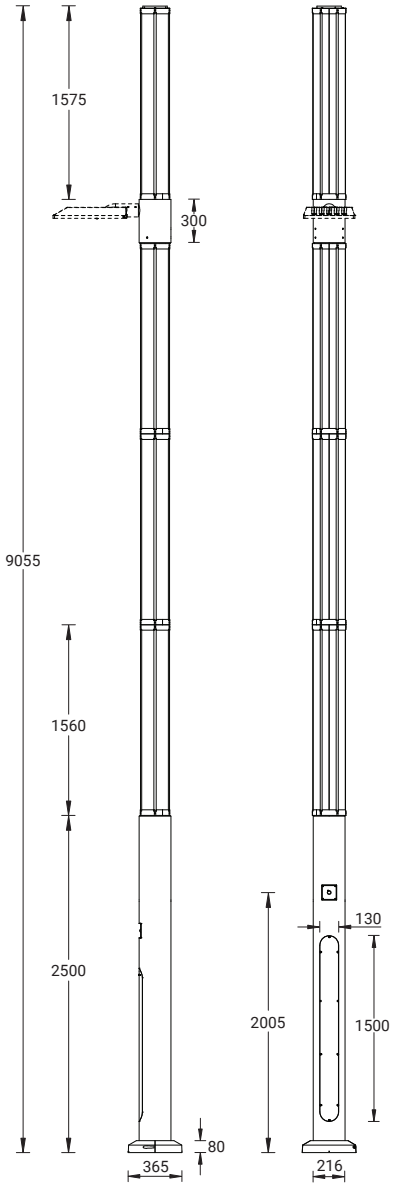
LIGMAN's team of engineers can design a specific solar solution to meet the lighting requirements for your project. Please contact your local sales representative.

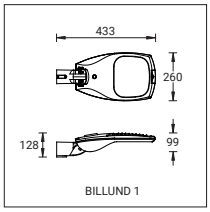
Standard:2 stage step-dimming, occupancy dimming and sensor.

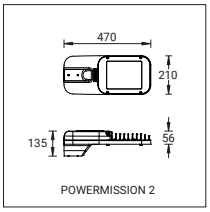


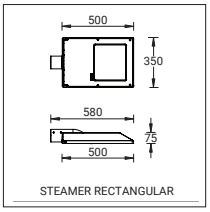
You can set the time and dim with the remote solar charge controller.

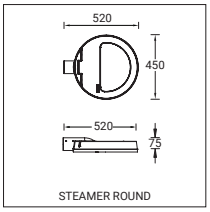






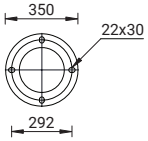








Solar module 140 W



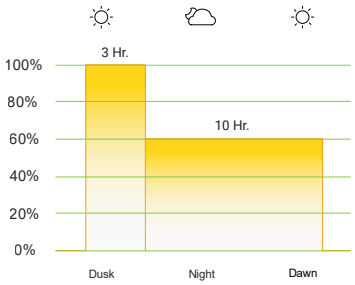
Mounting detail

SOLAR PV POLE 7

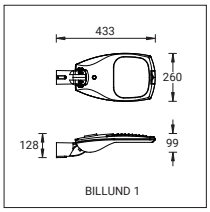
Solar module power	3x140 W
Battery	12V 8x16.5Ah
Diameter	Ø216
Luminaires operating 100 %	20 W (18-19 Hours)
	30 W (12-13 Hours)
	40 W (9-10 Hours)
	60 W (6-7 Hours)
	80 W (4-5 Hours)
Spigot	76 mm
Thickness	4 mm
Height	8000 mm
Weight	285.6 kg

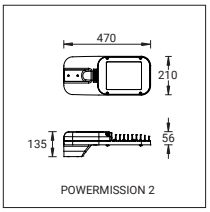
LIGMAN's team of engineers can design a specific solar solution to meet the lighting requirements for your project. Please contact your local sales representative.

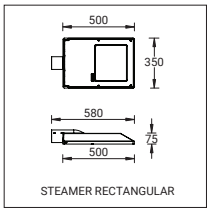
Standard:2 stage step-dimming, occupancy dimming and sensor.

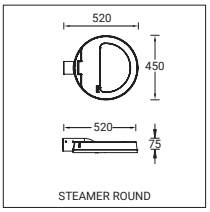


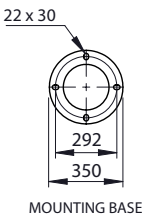
You can set the time and dim with the remote solar charge controller.

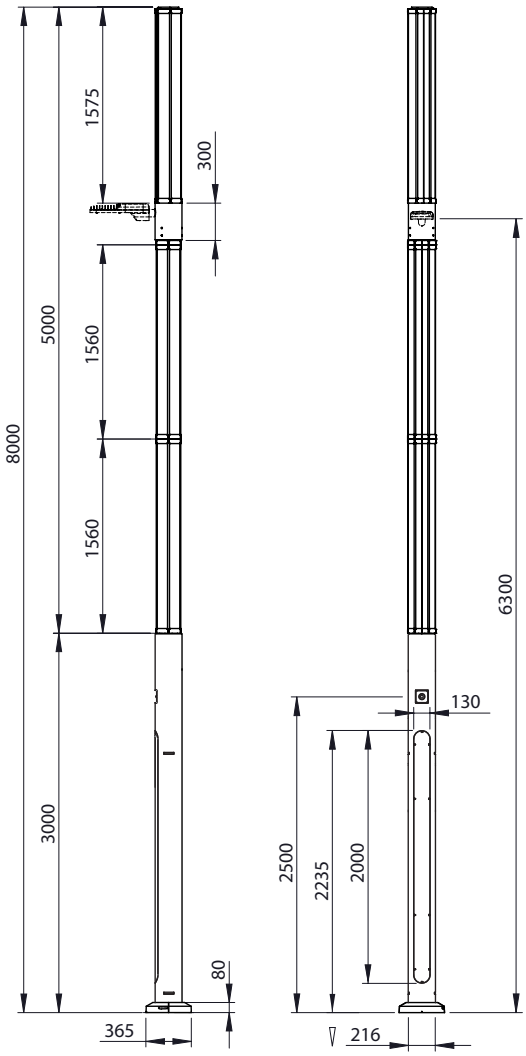








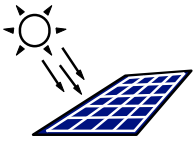






Caution and maintenance

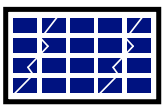




The installation area should be in an open space/position, offering a complete view of the sky from the PV. If the PV is subject to any shadows from trees, buildings or any other objects that will obscure sunlight and daylight, the system's efficiency of electricity production is reduced.



Clean the PV every 3-4 months or as appropriate. Accumulation of dirt, dust, sand or other organic material on the solar cell PV will reduce the efficiency of the electricity production.



Solar PV and batteries must not have any cracks or damage



The installation must be grounded to applicable local Earthing Standards

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Ligman is continually developing and improving its products. All details presented in this catalogue are correct at the time of printings and not to be regarded as a form of contract. Ligman reserves the right to change any specification without prior notification.

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